

IN THE CLAIMS

Claim 1 (Original): A water-absorbing composite, comprising water-absorbing polymer particles immobilized on a fibrous substrate wherein at least a part of said water-absorbing polymer particles comprise primary particles having an average particle diameter of about 50-1000 μm , wherein about 30 % by weight or more of said primary particles are combined to form agglomerates having a shape satisfying the following conditions while nearly maintaining their primary particle shapes and a part of particles of said agglomerates are not adhered to said fibrous substrate:

Average particle diameter (D) $100 \leq D \leq 3000 \mu\text{m}$

Average relative displacement of the direction by direction analysis (θ) $10 \leq \theta \leq 25$

Frequency analysis 5 Hz/20 Hz intensity ratio (k) $0.65 \leq k \leq 0.9$

Agglomerate maximum length (L) / minimum length (l) ratio $1.25 \leq L/l \leq 15.0$.

Claim 2 (Original): The water-absorbing composite of Claim 1, wherein about 50 % by weight or more of said water-absorbing polymer particles form said agglomerates.

Claim 3 (Original): The water-absorbing composite of Claim 1, wherein about 80 % by weight or more of said water-absorbing polymer particles form said agglomerates.

Claim 4 (Original): The water-absorbing composite of Claim 1, wherein said fibrous substrate comprises synthetic fibers, natural fibers, or semisynthetic fibers or a combination thereof.

Claim 5 (Original): The water-absorbing composite of Claim 1, wherein the fibrous substrate comprises hydrophilic fibers.

Claim 6 (Original): The water-absorbing composite of Claim 5, wherein the hydrophilic fibers comprise wood pulp, rayon, cotton or cellulose fibers.

Claim 7 (Currently Amended): The water-absorbing composite of Claim 4, wherein the fibrous substrate comprises fibers of polyester, polyethylene, polypropylene, polystyrene, polyamide, polyvinyl alcohol, polyvinyl chloride, polyvinylidene chloride, polyacrylonitrile, polyurea, polymethane, polyfluoroethylene or polyvinylidene ~~ee~~panide cyanide.

Claim 8 (Original): The water-absorbing composite of Claim 4, wherein the fibrous substrate comprises paper, wood or leather.

Claim 9 (Original): The water-absorbing composite of Claim 1, wherein said primary particles have an average particle diameter of about 100-900 μm .

Claim 10 (Original): The water-absorbing composite of Claim 9, wherein said primary particles have an average particle diameter of about 200-800 μm .

Claim 11 (Original): The water-absorbing composite of Claim 1, wherein said agglomerates have an average particle diameter of about 200-2,000 μm .

Claim 12 (Original): The water-absorbing composite of Claim 11, wherein said agglomerates have an average particle diameter of about 250-2,000 μm .

Claim 13 (Original): The water-absorbing composite of Claim 1, wherein said agglomerates exhibit an average relative displacement of the direction by direction analysis (θ) of from 12-24.

Claim 14 (Original): The water-absorbing composite of Claim 13, wherein said agglomerates exhibit an average relative displacement of the direction by direction analysis (θ) of from 14-22.

Claim 15 (Original): The water-absorbing composite of Claim 1, wherein said agglomerates exhibit a frequency analysis 5 Hz/20 Hz intensity ratio (k) of from 0.65-0.85.

Claim 16 (Original): The water-absorbing composite of Claim 15, wherein said agglomerates exhibit a frequency analysis 5 Hz/20 Hz intensity ratio (k) of from 0.65-0.80.

Claim 17 (Original): The water-absorbing composite of Claim 1, wherein said agglomerates have a maximum length (L)/minimum length (l) of from 1.5-10.0.

Claim 18 (Original): The water-absorbing composite of Claim 17, wherein said agglomerates have a maximum length (L)/minimum length (l) of from 1.5-8.0.

Claim 19 (Original): The water-absorbing composite of Claim 1, which comprises said water-absorbing polymer particles in an amount of from about 50-300 g/m².

Claim 20 (Original): The water-absorbing composite of Claim 19, which comprises said water-absorbing polymer particles in an amount of from about 100-250 g/m².

Claim 21 (Original): The water-absorbing composite of Claim 20, which comprises said water-absorbing polymer particles in an amount of from about 130-220 g/m².

Claim 22 (Original): The water-absorbing composite of Claim 1, wherein said agglomerates are formed by polymerizing an aqueous ethylenically unsaturated monomer solution with a redox polymerization initiator.

Claim 23 (Original): The water-absorbing composite of Claim 1, which is produced by forming droplets of a reaction mixture initialized by mixing an aqueous solution of a polymerizable monomer giving a water-absorbing polymer with a redox polymerization initiator in a gas phase, combining said droplets into agglomerates while nearly maintaining their primary particle shapes in the gas phase and/or on a fibrous substrate, supporting said agglomerates formed in the gas phase on said fibrous substrate, and then completing polymerization of said agglomerates on said fibrous substrate to immobilize said agglomerates on said fibrous substrate.

Claim 24 (Withdrawn): A process for preparing a water-absorbing composite, comprising the steps of

a) forming droplets of a reaction mixture initiated by mixing an aqueous solution of a polymerizable monomer giving a water-absorbing polymer with a redox polymerization initiator in a gas phase;

b) combining said droplets into agglomerates while nearly maintaining their primary particle shapes in the gas phase or on a fibrous substrate, or both;

c) supporting said agglomerates formed in the gas phase on said fibrous substrate; and
then

d) completing polymerization of said agglomerates on said fibrous substrate to immobilize said agglomerates thereon.

Claim 25 (Withdrawn): The process of Claim 24, wherein said polymerizable monomer has a polymerization degree of about 20-97 % when it comes into contact with said fibrous substrate.

Claim 26 (Withdrawn): The process of Claim 24, wherein said droplets of a reaction mixture are formed by mixing a first solution containing an oxidizing agent forming the redox polymerization initiator and the aqueous polymerizable monomer solution and a second solution containing a reducing agent forming the redox polymerization initiator and the aqueous polymerizable monomer solution in a gas phase.

Claim 27 (Withdrawn): The process of Claim 26, wherein said mixing is performed by colliding said first solution and said second solution in a liquid column state.

Claim 28 (Withdrawn): The process of Claim 24, wherein said polymerizable monomer is based on an aliphatic unsaturated carboxylic acid or a salt thereof.

Claim 29 (Withdrawn): The process of Claim 24, wherein said polymerizable monomer is based on acrylic acid in which 20 mol % or more of the carboxyl group is neutralized into an alkali metal salt or an ammonium salt.

Claim 30 (Withdrawn): The process of Claim 24, wherein the oxidizing agent forming said redox polymerization initiator is hydrogen peroxide and the reducing agent is L-ascorbic acid or an L-ascorbic acid alkali metal salt.

Claim 31 (Withdrawn): The process of Claim 24, wherein said fibrous substrate comprises synthetic fibers, natural fibers, or semisynthetic fibers.

Claim 32 (Original): A water-absorbing article, comprising a water-absorbing material having water-absorbing polymer particles immobilized on one side of a fibrous substrate so that said water-absorbing polymer particles absorb aqueous liquids through said fibrous substrate, wherein at least a part of said water-absorbing polymer particles consist of primary particles having an average particle diameter of about 50-1000 μm , wherein about 30 % by weight or more of said primary particles are combined to form agglomerates having a shape satisfying the conditions below while nearly maintaining their primary particle shapes and a part of particles of said agglomerates are not adhered to said fibrous substrate:

Average particle diameter (D) $100 \leq D \leq 3000 \mu\text{m}$

Average relative displacement of the direction by direction analysis (θ) $10 \leq \theta \leq 25$

Frequency analysis 5 Hz/20 Hz intensity ratio (k) $0.6 \leq k \leq 0.9$

Agglomerate maximum length (L)/minimum length (l) ratio $1.2:5 \leq L/l \leq 15.0$.

Claim 33 (Original): A water-absorbing article, comprising a water-absorbing material having water-absorbing polymer particles immobilized on one side of a fibrous substrate so that said water-absorbing polymer particles absorb aqueous liquids through said fibrous substrate, wherein immobilization of said water-absorbing polymer particles comprises the steps of

a) forming droplets of a reaction mixture initialized by mixing an aqueous solution of a polymerizable monomer giving a water-absorbing polymer with a redox polymerization initiator in a gas phase,

b) combining said droplets into agglomerates while nearly maintaining their primary particle shapes in the gas phase or on a fibrous substrate or both,

c) supporting said agglomerates formed in the gas phase on said fibrous substrate, and then

d) completing polymerization of said agglomerates on said fibrous substrate to immobilize said agglomerates on said fibrous substrate.

Claim 34 (Original): The water-absorbing article of Claim 32, wherein said fibrous substrate is in the form of a sheet.

Claim 35 (Original): The water-absorbing article of Claim 34, wherein said fibrous substrate is a nonwoven cloth.

Claim 36 (Original): The water-absorbing article of Claim 35, wherein said fibrous substrate is a nonwoven cloth consisting of fibers having a diameter of about 10-50 μm .

Claim 37 (Original): The water-absorbing article of Claim 32, wherein said fibrous substrate has a basic weight of about 10-100 g/m².

Claim 38 (Original): The water-absorbing article of Claim 32, wherein the surfaces of said water-absorbing polymer particles are crosslinked.

Claim 39 (Original): The water-absorbing article of Claim 32, wherein said water-absorbing polymer particles are immobilized on said fibrous substrate at 50-300 g/m².

Claim 40 (Original): The water-absorbing article of Claim 32, wherein a fluffy pulp layer is provided on the water-absorbing polymer particle side of said water-absorbing material.

Claim 41 (Original): The water-absorbing article of Claim 40, wherein a fluffy pulp layer is provided on each side of said water-absorbing material and the fluffy pulp layer provided on the water-absorbing polymer particle side has a greater basic weight than that of the fluffy pulp layer provided on the fibrous substrate side.

Claim 42 (Original): The water-absorbing article of Claim 40, wherein the fluffy pulp layer provided on the water-absorbing polymer particle side of said water-absorbing material has a basic weight of about 80-250 g/m².

Claim 43 (Original): The water-absorbing article of Claim 33, wherein said fibrous substrate is in the form of a sheet.

Claim 44 (Original): The water-absorbing article of Claim 43, wherein said fibrous substrate is a nonwoven cloth.

Claim 45 (Currently amended): The water-absorbing article of Claim 44, wherein said fibrous substrate is a nonwoven cloth consisting of fibers having a diameter of about 10-50 μm .

Claim 46 (Original): The water-absorbing article of Claim 33, wherein said fibrous substrate has a basic weight of about 10-100 g/m^2 .

Claim 47 (Original): The water-absorbing article of claim 33, wherein the surfaces of said water-absorbing polymer particles are crosslinked.

Claim 48 (Original): The water-absorbing article of claim 33, wherein said water-absorbing polymer particles are immobilized on said fibrous substrate at 50-300 g/m^2 .

Claim 49 (Original): The water-absorbing article of claim 33, wherein a fluffy pulp layer is provided on the water-absorbing particle side of said water-absorbing material.

Claim 50 (Original): The water-absorbing article of claim 49, wherein a fluffy pulp layer is provided on each side of said water-absorbing material and the fluffy pulp layer provided on the water-absorbing polymer particle side has a greater basic weight than that of the fluffy pulp layer provided on the fibrous substrate side.

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Claim 51 (Original): The water-absorbing article of claim 49, wherein the fluffy pulp layer provided on the water-absorbing polymer particle side of said water-absorbing material has a weight of about 80-250 g/m.².